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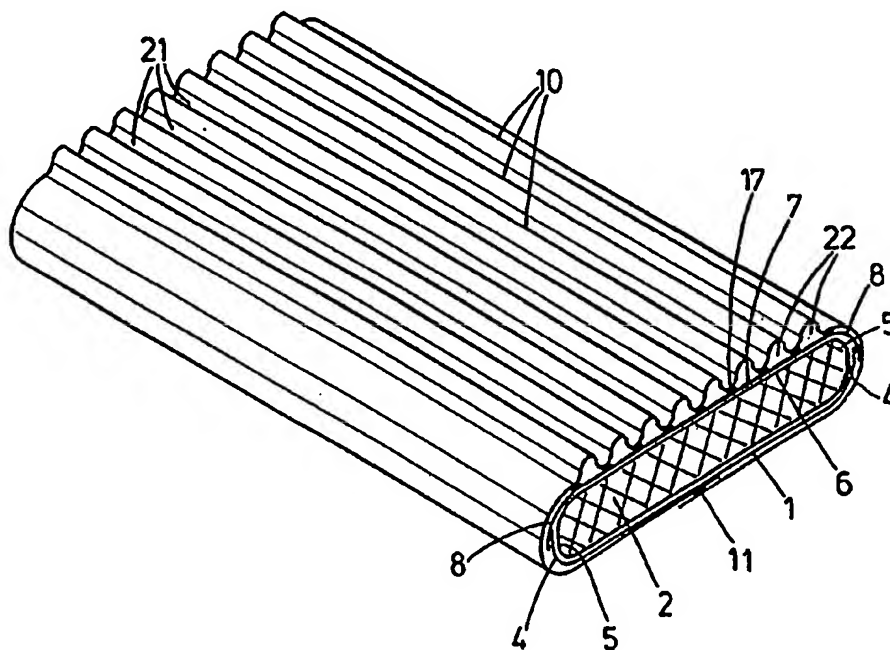
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(54) Title: CORRUGATED TOP LAYER FOR ABSORBENT ARTICLES



(57) Abstract

An absorbent sanitary product for the absorption of body liquids consisting of a liquid-proof covering layer (underwear protecting foil 1) on the back, a liquid-permeable covering layer (9) on top and an absorbent body (2) inserted between back and top covering layer (9, 1). The top covering layer (9) is equipped with two or more folds (10) on the area within the absorbent body, which folds (10) follow the longitudinal direction of the product.

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## CORRUGATED TOP LAYER FOR ABSORBENT ARTICLES

The invention relates to an absorbent sanitary product for the absorption of body fluid, such as sanitary napkins, diapers, incontinence articles or the like, with the features mentioned in the preamble of claim 1.

Sanitary products of this type are well-known in a large variety. They are all provided with a liquid-proof covering layer on the back and a liquid-permeable covering layer on the top with an absorbent body inserted between these two layers.

The covering layer on the back usually consists of a thin polyethylene foil. The liquid-permeable covering layer is mostly of nonwoven material, but perforated foils can also be used.

Normally the absorbent body is produced of cellulosic flocs or so-called air-laid-material.

In addition to the basic absorptive capacity of the absorbent body the product's technical features of the body-facing covering layer such as the tactile softness, absorbing time in relation to the body liquids, the distribution over the sanitary product and the rewet properties are of vital importance. The nonwoven covers normally used for the body-facing cover layer are comparable in most of the above-mentioned features.

The previously mentioned perforated foils have been improved in their absorptive capacity and in the visual impression after admission of menstruation liquid for instance, whereas impairments might occur by the plastic-like character of the perforated foils which causes perspiration.

Above-mentioned properties of the body-facing covering layer regarding the absorbing time and distribution of incurring body liquids and rewetting have a major impact on the leaking safety of the respective sanitary product. Due to the technical standard a variety of measures are known which influence these factors positively. For instance a transport layer has been inserted under the body-facing covering layer to improve the absorbing time and the rewet properties. Improvements on the liquid distribution in the longitudinal direction of mentioned sanitary products - which lead to an increased safety against lateral leakage of the body liquid - have been substantially obtained by impressed, longitudinal lines on the surface of a sanitary napkin.

A substantial contribution regarding the sanitary product's leaking safety are so-called cuffs, which, arranged on both of the lateral longitudinal margins of the absorbent body, form a liquid barrier that stays upright by means of elastified material and hinders lateral leakage of the body liquid. While these cuffs greatly increase the leaking safety, they considerably complicated the production of sanitary napkins, diapers, incontinence articles and the like.

Base on mentioned deficiencies it is an object of the invention to modify sanitary products of the generic type in a manner, that the soft, natural touch of the surface is maintained while the wearing comfort, the longitudinal distribution of body liquids and the rewet properties are improved and increased leaking safety can be provided.

This object is achieved by the features of the characterizing part of claim 1. By folding the front covering layer as claimed, a surface is created which most suitably can be referred to as "pleating".

These folds built at the same time longitudinal channels on the sanitary product's surface to improve the liquid distribution in the longitudinal direction and also create barriers against a dispersion of liquids in transversal direction. This considerably improves the sanitary product's leaking safety.

Furthermore the folds in most areas of the covering layer built a spacing between themselves and the absorbent body underneath, which improves both the absorptive or penetrating action of the body liquid into the absorbent body and the rewet properties. The visual impression after admission of for instance menstruation liquid will also be improved because raised folded areas are not in contact with the liquid-soaked absorbent body. The flexibility of the folds will also have an effect on the softness of the body-facing surface of the sanitary product thus providing a higher wearing comfort and the natural comfort and the natural touch.

Due to the fixing of folds these are stabilized in such a manner, that the created positive effects will remain, even after storage in pressed condition and over an extended wearing period.

Besides according to claim 1 the foot area of the folds can be directly fastened by glueing or welding on the absorbent body or on a support layer which is inserted between the covering layer and the absorbent body. This support layer helps to improve the functional features of the folds regarding the further transmission of liquid and the rewet properties.

Claims 2 and 3 indicate advantageous dimensional ranges for the folds.

According to the preferred embodiment of claim 4 more folds can be provided to be spread over the entire width of the absorbent body's surface. This results in a maximum product improvement.

Optionally the folds can only be arranged in stripes on the absorbent body's surface, which run along the margins and/or in the center (claim 5).

Additional features, details and advantages of the invention can be taken from the following description, in which various embodiments of the invention are explained referring to the attached drawings.

Fig. 1 is a perspective partial view of a sanitary napkin,

Fig. 2 is a cross-section of a sanitary napkin according to Fig. 1 with a partial enlargement,

Fig. 3 is a cross-section of a sanitary napkin's second embodiment,

Fig. 4 is a cross-section of a sanitary napkin's third embodiment, and

Fig. 5 is a schematic perspective view of a sanitary napkin's surface in a fourth embodiment.

As can be seen in the attached drawings, the different embodiments of the respective sanitary napkin all have a base structure which is identical in vital parts. The back is provided with a liquid-proof covering layer, the underwear protecting foil 1, which is underneath the absorbent body 2 consisting of a pad of cellulosic flocs in the area of its back 3 - i.e. on the body-averting side of the sanitary napkin when worn. Furthermore the longitudinal edges 4 of the underwear protecting foil 1 reach over the lateral margin 5 of the absorbent body.

A support layer 7 for instance made of nonwoven material is arranged on the front surface area 6. The longitudinal edges 8 of this support layer 7 also reach over the lateral margin 5 of the absorbent body 2 and overlap the longitudinal edges 4 of the underwear protecting foil 1. Both of these parts are glued together in the usual manner in the overlapping area.

On top of support layer 7 a liquid-permeable covering layer 9 is arranged which is provided with folds 10 as later described in detail. The embodiments of the sanitary napkin shown in Fig. 1, 2 and 4 are a so-called "fully wrapped sanitary napkin", which consists of a covering layer 9 - for instance of polypropylene card web - and encloses the absorbent body 2 and the support layer 7. Covering layer 9 is folded on the back 3 and attached to the center by means of a glued connection 11.

The embodiments according to Fig. 3 and 5 are provided with lateral wings 12, which are formed by overlapping flaps 13, 14 being connected to the lateral margins of covering layer 9 on the front and covering layer 15 on the back. The covering layer 15 might be of nonwoven material such as the case in the embodiment shown in Fig. 3. which shall be provided with a separate underwear protecting foil 1. The covering layer can also consist of liquid-proof material, for instance of polyethylene foil, thus taking over the underwear protecting foil's function and omitting it.

Now the different configurations of folds used in illustrated sanitary napkins shall be explained in more detail.

The folds 10 are formed by a suitable folding device in the sanitary napkin's production machine so that the foot areas 16 are located on support layer 7 with a spacing of 1 to 20 mm in the transversal direction of the sanitary napkin. A spacing of 3 to 5 mm has proven to be most practicable. The foot areas 16 are attached to the support layer 7 by means of longitudinal glue strips 17, for instance of spray adhesive. Between each adjacent foot area 16 the fold 10 stands upright with a height H ranging from 1 to 20 mm. The most practicable values for the height were also in the area of 3 to 5 mm. The foot width F defined by the glue strips 17 can vary from 0.2 to 10 mm depending on the spacing A and the height H, whereas it must be considered that the maximum foot width F is half the spacing A. With spacing A and height H in the range of 3 to 5 mm, foot widths of 0.5 to 1 mm proved to be successful.

In the embodiments shown in Fig. 1 through 3 eight folds are provided evenly spread over the entire width of the absorbent body's surface, working with a spacing A of approx. 6 mm between the folds.

In the embodiment shown in Fig 4 within two lateral strips 18 two folds 10, respectively, are provided, which run in the longitudinal direction of the sanitary napkin and which have a spacing A and height H of approx. 6 mm. The remaining center strip 19 between both lateral strips

18 consists of a liquid-permeable covering 9 which lays evenly on top of the support layer 7 to which it is additionally fastened by a center glue strip 17'. A liquid-permeable glueing over the entire area can also be obtained with a small quantity of adhesive.

The embodiment of a sanitary napkin shown in Fig. 5 has in addition to folds 10 on both lateral strips 18 further folding configurations, symmetrical to center plane L consisting of three folds 10, whereas a strip without folds 20 remains between the center folds 10 and the lateral folds 10.

Like noticeable from the cross-sections according to Fig. 2 through 4, the top of the folds 10, the chamfers 21 in between and the tubes 22 which are underneath the folds 10 between the glued foot areas 16 built channels for the longitudinal distribution of body liquids admitted on the sanitary napkin.

Closing it has to be pointed out that the individual components of the invented sanitary napkin shall be of suitable material available on the market according to common criteria for the production of these sanitary products. Suitable constructional measures shall be utilized. For instance it is advisable to glue the strips 17 on the support layer (7) surface in such manner, that they hinder the penetration of liquids only to a very small extent that the absorbent surface of the sanitary napkin still remains relatively high. Spray adhesive or small threads of melt-blown adhesive can be used, another possibility is welding or sealing by laser, ultrasound or heat.



## Claims

1. An absorbent sanitary product for the absorption of body liquids, especially sanitary napkins, diapers, incontinence napkins or similar, with

- a liquid-proof covering layer (1) on the back,
- a liquid-permeable covering layer (9), preferably of nonwoven material, on the top and
- an absorbent body (2) inserted between the back and top covering layer (9, 1)

characterized in that the top covering layer (9) in the area of the absorbent body (2) is arranged in two or more folds (10) following the longitudinal direction of the product, that the foot areas (16), directing towards the absorbent body (2) of the folds (19), are attached to the absorbent body (2) or to a support layer (7) inserted between the absorbent body (2) and the top covering layer (9) and that the foot areas (16) of the folds (19) are glued (glue strips 17) or welded on the absorbent body (2) or the support layer (7) over a width (foot width F) of preferably  
0.2 - 10 mm.

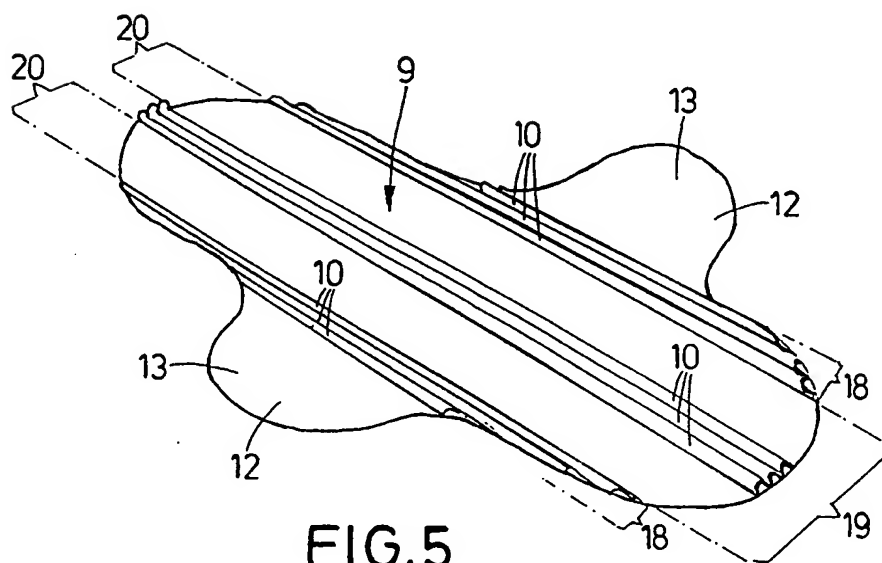
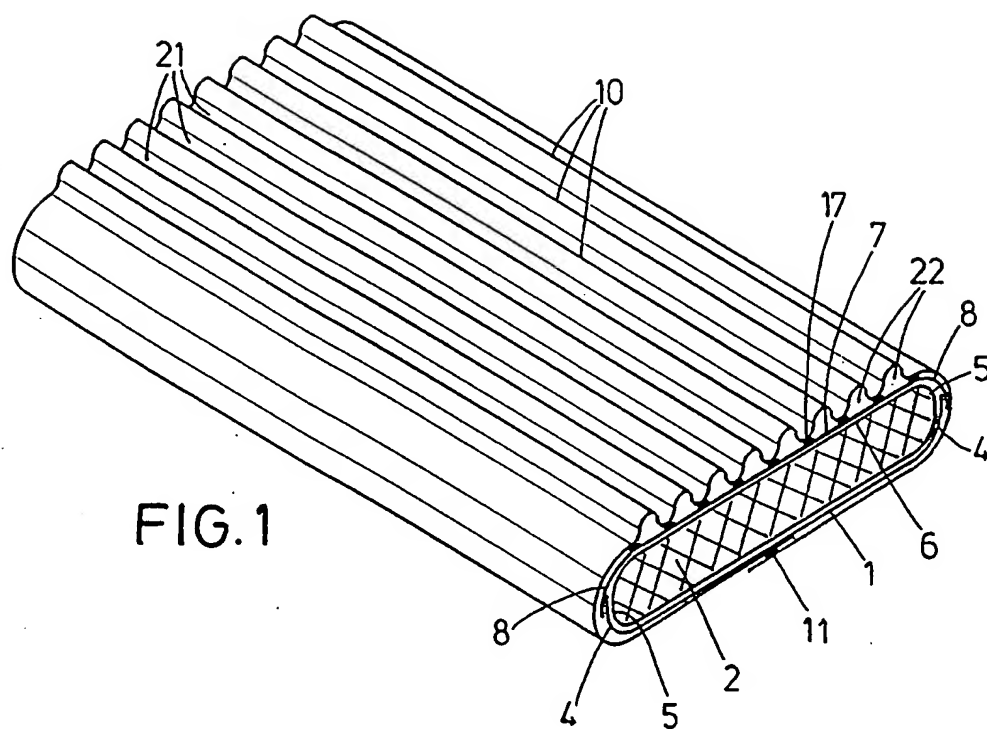
2. A sanitary product according to claim 1, characterized in that the foot areas (13) of two adjacent folds (19) are fixed with a mutual spacing (A) of 1 - 20 mm.

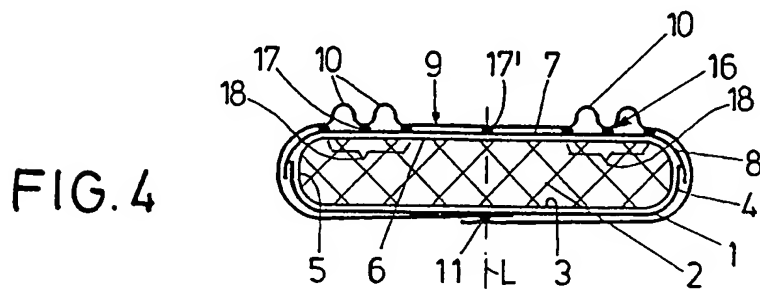
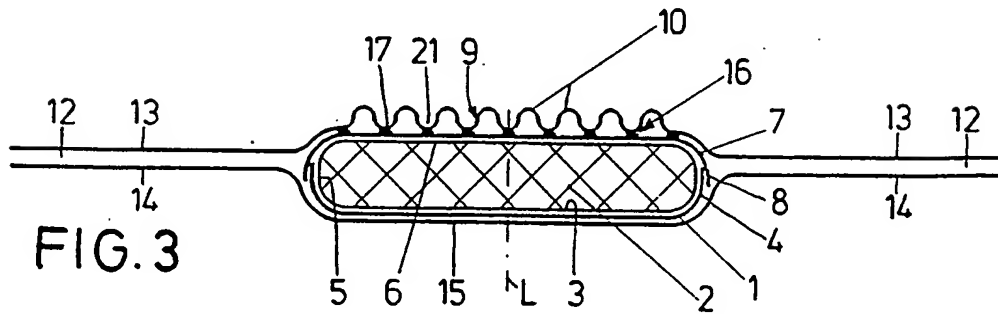
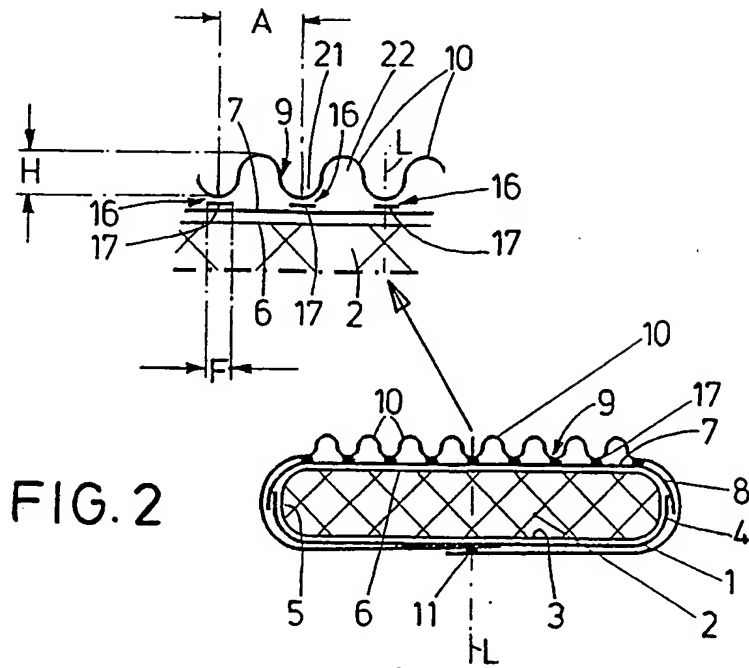
3. A sanitary product according to claim 1 or 2, characterized in that the height (H) of the folds (10) is 1 - 20 mm in no-load condition.

4. A sanitary product according to one of the claims 1 - 3, characterized in that several, preferably 5 to 25 folds (10) are arranged over the entire width of the surface of the absorbent body (6).

5. A sanitary product according to one of the claims 1 - 3, characterized in that several, preferably 2 - 10 folds (10) are provided on a partial lateral width of the absorbent body's surface (6) and/or a center strip (18, 19).

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# INTERNATIONAL SEARCH REPORT

Int. onal Application No  
PCT/EP 95/02466

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|---|--|---|
| <b>A. CLASSIFICATION OF SUBJECT MATTER</b><br>IPC 6 A61F13/15   |  |   |
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| Category *  | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No.   |
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| <div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.</span> <span><input checked="" type="checkbox"/> Patent family members are listed in annex.</span> </div>   |  |   |
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| Name and mailing address of the ISA<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax (+ 31-70) 340-3016   |  | Authorized officer<br><br><div style="text-align: center;">Douskas, K</div>                                 |

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Information on patent family members

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